

Remarks:

Regarding the amendments to the Specification:

As requested by the Office, the specification has been amended to insert reference to PCT/AU02/00994 filed 07/27/2001.

The applicant makes note that a certified copy of the priority document, PCT/AU01/00920 had been transmitted to the Office on 23 February 2004 which was filed by USPS First Class Mail.

Regarding the amendments to the claims:

The amendments to the claims are based on the claims entered in the *Preliminary Amendment* which was filed with the application filing papers. The applicant requests that amendments to the claims presented herein are to be entered without prejudice or disclaimer; the applicant expressly reserves the right to reinstate canceled or amended subject matter at a later date in the present application or in a continuing or divisional application.

Regarding the rejection of claim 17 under 35 USC 112:

The amendments to claim 17 entered herein are believed to moot this ground of rejection.

Regarding the rejection of claims 1-27 under 35 USC 102(b) and/or under 35 USC 103(a) in view of US 4871466 to Wang et al.:

The applicant traverses the rejection of the claims over the Wang reference.

Prior to discussing the relevance of the Wang prior art document, the applicant points out that in the presently presented claims, independent claim 18 has been amended to require that the composition is essentially free of water insoluble solvents. Independent claim 28, which is newly presented in this paper, requires that the fatty hydroxamate is formed by combining hydroxylamine in a free base form with the fatty acid ester. It is to be pointed out that both of these claimed methods permit for the omission of water insoluble solvents in either of these processes, which provide an important and unexpected advantage over the prior art which is both novel and inventive in nature.

The applicant directs the Examiner's attention to the applicant's specification particularly to page 2 wherein the applicants observe that the presence of an organic solvent significantly reduces the activity of the hydroxamate in froth flotation. Surprisingly the applicant has discovered, as explained on pages 4-5, that a surprising and significant improvement in mineral recovery can be achieved when utilizing fatty hydroxamate of pH of at least 11 which has been observed to give rise to a greater level of activity in flotation of mineral values. While not wishing to be bound by the following, the inventor hypothesizes at page 4 of the specification that this striking improvement in mineral recovery is believed to be due to formation of the more active *cis*-enolate form of the hydroxamate when it is prepared in aqueous composition of pH at least 11 and is used in this form. Further, the present inventor notes that the activity of the hydroxamate in the ore slurry is not determined by the pH of the ore slurry but rather, is determined by the pH of the aqueous hydroxamate added to the ore slurry. As the inventor explains on page 7 of the specification that while the optimum pH of the ore slurry may depend on nature of the mineral being recovered, however due to the addition of a fatty hydroxamate at an elevated pH (preferably of about 11 or greater) the preferred *cis*-enolate form of the hydroxamate is formed and caused chelation of the desired minerals from the ore slurry. As demonstrated in Example 2, the *cis*-enolate form of the hydroxamate

is believed to provide the significantly enhanced recovery of minerals as demonstrated in that example.

This surprising and commercially significant technical effect is not believed to be known from the prior art, nor can be fairly considered as being suggested by the prior art considered either jointly or severally.

The present inventor points out that the claims of the present application have been amended herein, and now includes two independent claims. Claim 18 has been amended to limit the nature of the hydroxamate to a fatty hydroxamate and to require that the aqueous fatty hydroxamate is essentially free of water insoluble solvents. Support for the amendments can be found in the applicant's specification generally, and may be specifically found at the passages found at page 2 line 11 to 14 and page 3 lines 16 and 17. The second independent claim, newly presented claim 28, is directed to a method of collecting mineral values by froth flotation in which the fatty hydroxamate of pH 11 used in the froth flotation process is formed from an aqueous fatty ester composition by reaction with hydroxylamine free base in alkali followed by further addition of alkali to provide the required pH. Both claims 18 and 28 are also directed to a method of froth flotation in which an aqueous fatty hydroxamate solution of pH over 11 is added to a slurry of minerals.

The presently claimed methods now delineated by claims 18 and 28 and their dependent claims are believed to clearly distinguish over the prior art of record cited by the Office.

Returning now to the Wang et al. reference, the Examiner has rejected claims under 35 USC 102(b) as anticipated or obvious over Wang. The present inventor traverses these alternate grounds of rejection. Wang teaches a reaction process and product wherein the ester of a fatty acid is reacted with a hydroxylamine salt and alkali metal hydroxide in the presence of an aqueous/organic composition

based on a C₈-C₂₂ alcohol/water mixture. It is apparent from the Wang reference that the presence of the C₈-C₂₂ alcohol/water mixture is an essential feature in that during Wang's reaction, the C₈-C₂₂ alcohol mixture forms a water insoluble phase which, in the case of the subsequently neutralized acid, allows for extraction of the final product.

Claim 18 is now limited to require that the composition is essentially free of water insoluble solvents and is therefore, *prima facie*, is distinguish from the teaching of the Wang reference. Claim 28, directed to a method of preparation of the hydroxamates is also *prima facie* distinguishable from the Wang disclosure in that in the present Inventor's claim the fatty hydroxamate is formed by combining hydroxylamine free base with the fatty acid ester. Both of these claims are further distinguishable and are non-obvious over Wang, in that a skilled artisan would find no motivation to omit the very constituent, namely the water insoluble alcohol from Wang's process particularly in that Wang discloses the inclusion of this water insoluble organic solvent as the basis for his improved process.

The Examiner further rejects the claims of the presently application as being obvious in view of Wang's recitation of several Russian language references which are discussed by Wang. The present inventor traverses these rejections as well based on Wang's recitation. As explained by Wang in column 2 line 24, the Russian workers teach the formation of solid salts which are clearly admitted by Wang to be difficult to handle and to process. The apparent solution to these technical problems encountered by the Russians is that which forms the basis for Wang's own invention, namely to react the ester of a fatty acid with a hydroxylamine salt and alkali metal hydroxide in the presence of an aqueous/C₈-C₂₂ alcohol mixture. This is required, as Wang teaches, as the aqueous/C₈-C₂₂ alcohol mixture forms a water insoluble phase which, in the case of the subsequently neutralized acid allow extraction of the final product as has

been discussed, *supra*, as being distinguishable from the presently claimed invention which does not require an insoluble organic solvent.

Turning now to the first Russian reference referred to by Wang et al, that reference is recited as teaching the reaction of one mole of metal ester with 1.45 mole of hydroxylamine sulphate, 7.39 to 7.82 moles of sodium hydroxide for 2 hours at 20 to 25°C. and 1 hour at 55-60°C. The composition is then acidified to pH of 4 to 5 at a temperature below 40°C. Clearly the work by Wang in the first Russian reference is directed to preparing and isolating the fatty hydroxamic acid product from the reaction mixture. Equally clearly, the first Russian reference does not appear to suggest preparation of the fatty hydroxamate salt, nor more specifically a fatty hydroxamate salt in an aqueous mixture of pH at least 11.

The second Russian reference referred by Wang refers to using an ionic emulsifier in alkaline aqueous medium which is said to give an improved yield for valerihydroxamic acid and caprihydroxamic acid. Wang explains that to obtain these yields, presumably yields of valerihydroxamic acid and caprihydroxamic acid, this second Russian reference teaches that a 40% excess of hydroxylamine hydrochloride or sulphate was required. Wang continues on to note that the second Russian reference reports that both the sodium salt and free hydroxamic acid recovered but are recovered as solids which are difficult to handle and process. It is not clear whether the sodium salt which is referred to in the second Russian reference is an intermediate to formation of the acid as suggested in the previous paragraph of Wang's discussion, or whether it is for use in froth flotation. Nonetheless, even if it is presumed that the second Russian reference were to suggest that the recovered solids could be used in its own right in froth flotation, there is no disclosure of the addition of this recovered solid to a mineral slurry of a fatty hydroxamate which has a pH of at least 11. The context, and utility of these recovered, difficult to handle and process solids recited by the second Russian reference are unclear and thus fail to provide any useful

teaching or suggestion as to their utility in the manner taught and exemplified by the present inventor.

Wang recites that the third Russian reference apparently teaches the preparation of certain mixed C₈-C₁₁ hydroxamic acids, which are apparently prepared in hydrocarbons which would immediately be recognized by a skilled artisan as being water insoluble solvents. With reference to this the third Russian reference Wang continues and refers to the presence of 100 to 250 weight percent of a hydrocarbon containing less than 20% polar organic components. As such, it appears that this the third Russian reference also requires the presence of a water insoluble organic solvent as well as an essential constituent. Although the Examiner refers to the Comparative Examples G and H in Table 1 of Wang et al where it is said that sodium octyl hydroxamates and C₈-C₁₀ hydroxamate are the collector used from the Russian work which is previously referred to, the present inventor contends that it is not clear exactly how this material was prepared or in which form it is added. It appears from the reference on page 2 of Wang's specification that the hydroxamate is added in the solid form. In any case there is clearly no disclosure or teaching of the use of an aqueous solution of the hydroxamate having a pH of at least about 11, such as is presently claimed by the present inventor.

The Examiner further contends that, given the concentration amounts of sodium hydroxide used in the examples of Wang et al and suggested by the broad disclosure of the patent, the present inventor's claimed pH concentration ranges would be obvious thereover. The present inventor disagrees and traverses this argument.

Whereas Wang discloses a process for the preparation of hydroxamic acid and fatty hydroxamate salts using an aqueous/fatty alcohol, viz., aqueous/C₈-C₂₂ alcohol mixture, as the present inventor claims in his specification, such a

process has been observed to reduce the effectiveness of the resulting hydroxamate salt. The Russian documents and their disclosure are equally unhelpful in providing or suggesting the inventive solution provided in the present application, in that while the Russian workers arguably teach the preparation of the fatty hydroxamate salt in solid form they however do not teach nor do they suggest an aqueous mixture of the hydroxamate salt of a pH at least 11. Clearly then, Wang considered on its own merits, and the Russian documents cited and discussed by Wang also fail to teach or suggest the instant inventor's presently claimed invention. Neither Wang nor the Russian documents provide any motivation to a skilled artisan to prepare such a composition as the present inventor provides, nor provide any recognition there would be any advantage in the efficiency of the hydroxamate when prepared in a composition of pH above about 11.

Regarding the rejection of claims 1 – 27 under 35 USC 102(e) and/or under 35 USC 103(a) in view of US 6145667 to Rothenberg:

The applicant respectfully traverses the rejection of the claims over the Rothenberg reference.

As cited by the Office, the Rothenberg reference teaches a fatty hydroxamic acid and oil for use in removing impurities from mineral ores by froth flotation. However, Rothenberg does not teach or suggest the addition of a hydroxamate of the pH above about 11 to an ore slurry as is taught by the present inventor. As a skilled artisan reading the Rothenberg reference would understand, Rothenberg's collectors are prepared by reaction of the fatty hydroxamic acid with a hydroxylamine salt in the presence of the oil and water. Although hydroxamic acid salt species of alkaline pH might be prepared according to Rothenberg's process of it is nonetheless abundantly clear that Rothenberg teaches that his compositions added to the ore slurry to collect mineral values

are in the nature of the fatty hydroxamic acid. Accordingly, it is believed by the present inventor that Rothenberg not teach nor suggest the present inventor's inventive process of adding an aqueous fatty hydroxamate composition to the aqueous ore slurry wherein the pH of the aqueous fatty hydroxamate composition is at least 11.

With respect to the Office's contention that the several Russian works anticipate the presently claimed invention, the instant inventor traverses this rejection, and for the sake of brevity incorporates herein the remarks entered above concerning the several Russian works made with reference to the Wang prior art document as being considered to be equally applicable here.

Regarding the rejection of claims 1 – 9, 15 and 18-27 under 35 USC 102(b) and/or under 35 USC 103(a) in view of US 5126038 to Nagaraj:

The applicant respectfully traverses the rejection of the claims over the Nagaraj reference.

As cited by the Office, the Nagaraj reference teaches the preparation of a fatty hydroxamic acid or salt thereof in a mixture of water insoluble alcohol and water. Reading the Nagaraj reference, it is abundantly clear that a skilled artisan would understand that essential to the process used by Nagaraj for preparation of the fatty hydroxamate requires the presence of the water insoluble alcohol in order to provide Nagaraj desired product. While such a process may be technically useful, it is nonetheless distinguishable with respect to the presently claimed invention. Nothing in the Nagaraj reference can be seen to teach, or for that matter to even remotely suggest the addition of an aqueous fatty hydroxamate composition to an aqueous ore slurry wherein the pH of the aqueous fatty hydroxamate composition is at least 11, which is a key technical teaching provided by the present inventor. In contrast thereto, Nagaraj fails to teach or

even remotely suggest any advantage in adding the fatty hydroxamate to the ore slurry at such a pH. Significantly is the fact that as Nagaraj teaches the use of water insoluble alcohol in his reaction, Nagaraj is wholly silent as to any benefits which might be achieved by the omission of the water insoluble alcohol which does not appear to be possible in view of Nagaraj's process and thus could not be considered obvious by a skilled artisan reviewing the Nagaraj reference.

Regarding the rejection of claims 1 – 13, and 17 under 35 USC 102(b) and/or under 35 USC 103(a) in view of US 4324654 to Rule:

The applicant respectfully traverses the rejection of the claims over the Rule reference.

As cited by the Office, according the Rule document it appears that the fatty hydroxamate salt is added as a powder instead of with an aqueous alkaline solution. Such requires addition of a pulverent form of the fatty hydroxamate salt, which can be distinguished from the presently amended claims which recite the addition of an aqueous fatty hydroxamate composition to the aqueous ore slurry wherein the pH of the aqueous fatty hydroxamate composition is at least 11. Such a method step is clearly not to be anticipated by Rule, and his pulverent form of the fatty hydroxamate salt. It is also the present inventor's view that the addition of the fatty hydroxamate with an aqueous alkaline solution having a highly alkaline pH, preferably a pH of at least about 11, would give rise to the surprisingly improved recovery of mineral values from an aqueous ore slurry by froth flotation as recited by the present inventor in his application, and as demonstrated, particularly in Example 2 discussed supra.

Reconsideration of the continued propriety of the rejection of the claims, in view of the foregoing amendments and remarks are solicited.

Regarding the applicant's claim to Foreign Priority:

The applicant makes note that a certified copy of the priority document, PCT/AU01/00920 had been transmitted to the Office on 23 February 2004 which was filed by USPS First Class Mail. The undersigned notes that the cover letter accompanying that certified document erroneously referred to PCT/AU02/00920. The undersigned apologizes for the inadvertent typographical error on that cover letter.

Petition for a one-month extension of time

The applicant respectfully Petitions for a one-month extension of time in order to permit for the timely entry of this response. The Commissioner is hereby authorized to charge the fee to Deposit Account No. 14-1263 with respect to this Petition.

Should any further fee be required by the Commissioner in order to permit the timely entry of this paper, the Commissioner is authorized to charge any such fee to Deposit Account No. 14-1263.

Favorable consideration of the presently amended claims, in view of the remarks provided is respectfully requested. As the amended claims are believed to be directed to patentable subject matter, the issuance of a Notice of Allowance is respectfully requested.

Respectfully Submitted;

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16 March 2005
Date:

Certificate of Telefax Transmission under 37 CFR 1.8

I certify that this document, and any attachments thereto, is being telefax transmitted on the date indicated below to telefax number : 703 872-9306 and is addressed to the: "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450."

Kimberly Brittingham
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16 March 2005
Date

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